Internal Audit Report

Plan Review and Bid Estimation Effectiveness

TxDOT Internal Audit Division

Objective

To evaluate the effectiveness of the plan review and bid estimation processes for construction projects across the state.

Opinion

Based on the audit scope areas reviewed, control mechanisms require improvement and only partially address risk factors and exposures considered significant relative to impacting reporting reliability, operational execution, and compliance. The organization's system of internal controls requires significant improvement in order to provide reasonable assurance that key goals and objectives will be achieved. Extensive improvements are required to correct control gaps and to address excessive residual risk that may result in potentially significant impacts to the organization including the achievement of the organization's business/control objectives. Progress to address the highest risk areas will likely not be achieved within 6 months.

Overall Engagement Assessment	Needs Improvement

Findings				
	Title	Control Design	Operating Effectiveness	Rating
Finding 1	Effectiveness of PS&E Review	X	X	Needs Improvement
Finding 2	Variability of PS&E Interim and Final Review	X	X	Needs Improvement
Finding 3	Bid Variance Analysis Documentation	X	X	Needs Improvement
Finding 4	Accuracy of Estimated Construction Project Cost Data	X	X	Needs Improvement

Management concurs with the above findings and prepared management action plans to address deficiencies.

Control Environment

Districts are responsible for the review of all project plans, specifications, and estimate (PS&E) packages which are created both in-house and through third-party hired consultants. For fiscal years 2019 and 2020, TxDOT executed a total of $1 billion in PS&E contracts to third-party consultants of which $256 million has been paid to date.

Review of the PS&E packages are performed by the districts at different intervals (i.e., milestones) of the plan development process (i.e., 30%, 60%, 90%, 95%/100%). The Design Division (DES) is responsible for establishing policy for PS&E development, performing a final completeness check of the PS&E package, and online posting of the plans for contractors to prepare bids for letting. In addition to the final review, districts have the option to request a supplemental review of DES at any milestone stage of the development process.

The PS&E review methodology and documentation used to support the review process varies by district. Documentation retention locations differed across the districts (i.e., ProjectWise, Bluebeam, email, and/or hard copies). In addition, information to monitor project development

and report on project award is also retained in multiple locations including TxDOTConnect, the electronic bidding system, and individual district developed spreadsheets.

TxDOT reports annually to the Federal Highway Administration (FHWA) on a national performance measure established in 2004 using the percent of construction projects let that meet the goal of +/-10 percent variance between the engineer's estimate and the awarded low bid. The performance measure has not been modified since inception.

A prior internal audit of plan review performed in 2014 used a maturity model to evaluate the plan review process that measured the methods and processes at TxDOT against external benchmarks. The model illustrated a repeatable process for TxDOT at that time, and the current plan review process remains unchanged as noted by common processes and existing knowledge silos. A standardized framework to include knowledge sharing and performance metrics would be needed to advance growth and maturity of the plan review and bid estimation process.

Summary Results

Audit testing completed resulting in management action plans.

Finding	Scope Area	Evidence
1	PS&E Quality Control and Engineer's Estimate Variance Analysis	An analysis of the PS&E review process was performed using bid estimations, change orders, addenda, and rejected projects, for 842 completed construction projects in eight districts let between January 1, 2016 and August 31, 2020: <u>Bid Estimation Effectiveness</u> The variance between the engineer's estimate and awarded low bid was compared to the national goal of 50% of projects within a +/-10% variance. ▪ For the period reviewed, the yearly average for the combined districts ranged from 42% to 53%. Analysis of the individual district yearly averages identified five of eight districts (63%) not meeting the 50% goal. <u>Change Orders</u> An analysis of change orders was performed to identify if the change order was a result of a PS&E design issue. ▪ 336 of 842 (40%) projects and 913 of 3,028 (30%) change orders were designated as having a PS&E error or omission. ▪ The PS&E impacts were $23.6M of $116M (20%) of the total executed change orders. <u>Addenda</u> Eighty of the 842 completed construction projects were reviewed to determine the frequency addenda were developed to address PS&E errors or omissions made prior to project letting.

		▪ 32 of 80 (40%) projects had addenda created after final PS&E review and prior to letting to correct design errors. Projects Delayed Due to Rejected Bids A review of all projects (18) with rejected bids for the eight districts was performed to determine the root cause of the bid rejection and possible resulting delay impact to the project. ▪ 6 of 18 (33%) projects required revisions due to design errors not identified during plan review. An additional 87 to 240 days were needed to prepare for re-letting.
2	PS&E Quality Control	PS&E Review Methodology Plan review and bid estimation methodology and tools varied across the eight sampled districts for completed projects, including milestones when review is performed, and district developed checklists and standard operating procedures. Retention of PS&E Supporting Documentation Although not required in TxDOT policy, testing was performed to determine if documentation was retained to support each district's PS&E review process. Plan Review ▪ 35 of 60 (58%) projects did not have evidence to support completion of the 30% review. ▪ 23 of 40 (58%) projects did not have evidence to support completion of the 90% review. ▪ 33 of 70 (47%) projects did not have evidence to support completion of the 60% review. Final PS&E Review ▪ 9 of 80 (11%) projects had no evidence to support the district final review of the PS&E package. ▪ 8 of 80 (10%) projects had no evidence to support DES final review of the PS&E package for completeness. Engineer's Estimate ▪ 54 of 80 (68%) projects did not have evidence to support review of pricing. ▪ 25 of 80 (31%) projects did not have evidence to support review of quantities.
3	Engineer's Estimate Variance Analysis	A review of the justification form used to support award or rejection for 52 of 80 completed construction projects let between January 1, 2016 and August 31, 2020 was performed to determine the cause of the +/- 20% variance and if the documentation was retained.

		Justification Form Analysis ▪ 20 of 52 (38%) projects had justification forms that did not include the reason for the variance to support the district bid award/rejection recommendation for $75M in projects. Retention of Justification Forms ▪ 15 of 52 (29%) projects did not have the justification form retained by the district, but was obtained from the Construction Division (CST).
4	Engineer's Estimate Variance Analysis	A comparison of the engineer's estimate and the awarded low bid letting amounts were made between CST letting data and TxDOTConnect data for 842 completed construction projects. ▪ 341 of 842 (40%) projects had differences noted ($609M) between the engineer's estimate amounts. ▪ 86 of 842 (10%) projects had differences noted ($15M) between the low bid amounts.

Audit Scope and Methodology

The audit was conducted during the period from December 11, 2020 to May 7, 2021. Testing focused on 8 judgmentally selected districts with 842 completed construction projects let between January 1, 2016 and August 31, 2020 with a low-bid award of $3.1B.

Scope Area 1: Plans, Specifications & Estimate (PS&E) Quality Control – verification of the review and approval of construction project PS&E packages prior to project letting.

Methodology included:

- Judgmentally selected eight districts based on a five-year average variance between the engineer's estimate and low bid amount (bid variance) for completed construction projects let between January 1, 2016 and August 31, 2020, that also included addenda totals and district size (i.e., metro, urban, or rural).
- Determined the PS&E review methodology for the eight sampled districts: Dallas, Lubbock, Lufkin, Odessa, Pharr, Paris, San Antonio, and Waco.
- Reviewed and verified documentation retained to support district review methodology of PS&E packages for 80 completed construction projects judgmentally selected based on bid variance, letting year, addenda totals, and change order data.
- Validated districts performed and retained the final (i.e., 95%/100%) review for the 80 sampled construction projects to include district approval prior to submission of PS&E to DES.
- Evaluated DES's final completeness check of the PS&E package prior to letting for the 80 sampled construction projects.
- Analyzed the variance in the cost of projects from initial project development (i.e., engineer's estimate) through award of the contract (i.e., low bid), including comparison of construction letting data maintained by CST to amounts in TxDOTConnect to validate accuracy of the information.

Scope Area 2: Engineer's Estimate Variance Analysis – evaluation of the trends in construction project bid variances and change orders related to project design and estimation.

Methodology included:

- Analyzed bid variance, change order, and addenda information for completed construction projects let between January 1, 2016 and August 31, 2020.
- Evaluated the review and monitoring of the bid variance and change order data by the eight sampled districts, DES, and CST.
- Determined the root cause within the justification form for a sample of 52 construction projects where the variance between the engineer's estimate and low bid exceeded the established variance threshold of +/- 20%, required addenda prior to letting, and/or had change orders executed that related to PS&E error or omission.
- Evaluated rejected bids for construction projects let between January 1, 2016 and August 31, 2020 from the eight sampled districts to determine the cause of the rejection and final resolution of the project.
- Reviewed district and division processes for communicating lessons learned from variance analysis, addenda, or change orders related to PS&E error or omission.

Methodology included within both Scope 1 and Scope 2:

- Reviewed governing criteria for the project development process that included:
  - Federal law: United States Code Title 23 Section 106 – Project Approval and Oversight.
  - State regulations: Texas Transportation Code Title 6, Chapter 201 – General Provisions and Administration, and Chapter 223 – Bids and Contracts for Highway Projects.
  - TxDOT policies and procedures: Project Development Process Manual, PS&E Preparation Manual, and CST letting overrun/underrun justification memorandum guidance.
- Interviewed Federal Highway Administration (FHWA) staff to verify plan review and reporting requirements.
- Interviewed DES, CST, and district personnel that included:
  - DES: Director, Deputy Director, PS&E Processing Section Director, and Project Development Section Director.
  - CST: Director, Letting Management Section Director, Construction Section Manager, Management Analyst, and Technical Project Manager.
  - District: District Engineers, Transportation Planning & Development (TP&D) Directors, and Transportation Engineer Supervisors.

Background

This report is prepared for the Texas Transportation Commission and for the Administration and Management of TxDOT. The report presents the results of the Plan Review and Bid Estimation Effectiveness audit which was conducted as part of the Fiscal Year (FY) 2021 Audit Plan.

Prior to the award of TxDOT projects to contractors, otherwise known as letting, TxDOT District Engineers (DE) must approve each project for their district. In advance of DE approval, these projects must undergo a district review of the PS&E package including a final review when the PS&E is substantially complete (i.e., 95%/100% review). Once reviewed and approved the PS&E package is submitted to DES for letting processing.

PS&E packages include the engineer's estimate for the quantity and cost of items necessary for the construction of the project, as well as, project cost estimates that are necessary to ensure appropriate funding is available at project letting. Projects require justification for approval of award or rejection by the Texas Transportation Commission under either of the following circumstances:

- There was only one bidder, and the low bid deviated +/-10% or more from the engineer's estimate.
- There were multiple bidders, and the low bid deviated +/-20% or more from the engineer's estimate.

We conducted this performance audit in accordance with Generally Accepted Government Auditing Standards and in conformance with the International Standards for the Professional Practice of Internal Auditing. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. Recommendations to mitigate risks identified were provided to management during the engagement to assist in the formulation of the management action plans included in this report. The Internal Audit Division uses the Committee of Sponsoring Organizations of the Treadway Commission (COSO) Internal Control – Integrated Framework version 2013.

A defined set of control objectives was utilized to focus on reporting, operational, and compliance goals for the identified scope areas. Our audit opinion is an assessment of the health of the overall control environment based on (1) the effectiveness of the enterprise risk management activities throughout the audit period and (2) the degree to which the defined control objectives were being met. Our audit opinion is not a guarantee against reporting misstatement and reliability, operational sub-optimization, or non-compliance, particularly in areas not included in the scope of this audit.

Detailed Findings and Management Action Plans (MAP)

Finding No. 1: Effectiveness of PS&E Review

Condition
Performance metrics to measure and report on the effectiveness of the district plans, specifications, and estimate (PS&E) package review process that can further be used to determine district interim and final plan review needs have not been established.

Effect/Potential Impact
An ineffective PS&E review process can lead to TxDOT not meeting the Federal Highway Administration (FHWA) national goal of 50% of projects falling within a +/-10 variance between the engineer's estimate and awarded lowest bid during letting, as well as, limit TxDOT's ability to set a higher internal performance metric and keep project plans current.

PS&E error or omission not identified before construction can result in increased probability of change orders which could increase the cost and time to complete the project. Change orders may also reduce the district's ability to use the original funding source(s) at the time of letting and put undue stress on other funding areas used by the district (i.e., Category 1 - Preventive Maintenance and Rehabilitation). Testing of 80 completed construction projects from the eight districts identified 56 projects that had change orders for $8.3M executed for PS&E error and omission and $7.1M of the funding for these was Category 1.

Criteria
The Project Development Process Manual requires the following:

- Chapter 1, Section 2: reasonable and accurate estimating helps maintain public confidence and trust throughout the life of a project. When project costs escalate, it impacts funding for future projects and requires records explaining cost escalation be maintained.
- Chapter 5, Section 10: an in-house district review of the PS&E package by a multi-disciplinary team as a quality control measure to reduce inconsistencies.

The PS&E Preparation Manual, Chapter 5, Section 5, states that clarity and accuracy in the plans will help achieve timely completion of construction with a reduced probability of having change orders or claims for additional compensation by the contractor.

FHWA's Guidelines on Preparing Engineer's Estimate, Bid Reviews, and Evaluation (January 20, 2004), states:

- The national goal is for the engineer's estimate to fall within a normal statistical distribution of +/-10% of the successful low bid for at least 50 percent of projects.
- Over-estimating causes inefficient use of funds that could be used for other projects.
- Under-estimating causes project delay while additional funding has to be arranged to the meet the contract costs.

Cause
Metrics to establish performance goals and evaluate plan review effectiveness, and communication of lessons learned within and across districts have not been established by the Design Division.

Evidence

Bid estimation performance was compared to the FHWA national goal, as well as, an analysis of addenda, rejected bids, and change orders for completed construction projects let between January 1, 2016 and August 31, 2020 for eight judgmentally selected districts to evaluate the effectiveness of the PS&E review process utilized.

Bid Estimation Effectiveness

The yearly average for the eight districts tested ranged from 42% to 53% of projects that were within a +/-10% variance (Table 1) compared to the FHWA goal of 50% of projects. Further analysis showed the range of projects that met the variance goal for the eight districts fluctuated with five of the eight districts (63%) not meeting the 50% goal.

Table 1

Percentage of All Completed Construction Projects Letting Variance within +/-10% by Calendar Year						
Districts	**2016**	**2017**	**2018**	**2019**	**2020***	**Grand Total**
Dallas	50%	56%	55%	50%	67%	53%
Lubbock	53%	17%	50%	36%	100%	38%
Lufkin	66%	52%	70%	57%	0%	61%
Odessa	33%	30%	52%	24%	0%	36%
Paris	50%	48%	53%	79%	0%	56%
Pharr	63%	31%	78%	0%	N/A**	46%
San Antonio	23%	39%	41%	60%	0%	37%
Waco	54%	42%	44%	45%	50%	46%
Grand Total	**49%**	**42%**	**53%**	**48%**	**40%**	**48%**

* 2020 includes projects let from January 1 to August 31st. **N/A – no completed projects in sample.

Change Orders

Using the same eight sampled districts, an analysis of executed change orders for 842 completed construction projects was performed (Table 2) to determine the impact of change orders on the variance between the total engineer's estimate and awarded low bid.

- 336 of 842 (40%) projects had 30% of the change orders executed that were categorized as PS&E error or omission.
- 23.6M of $116M (20%) change orders executed, were categorized as PS&E error or omission.

Table 2

District	Total Engineer's Estimate	Total Low Bid Awarded Amount	Variance Amount	Change Orders (CO)			PS&E Error and Omission CO		
				Projects	CO	Total Dollars	Projects	CO	Total Dollars
Dallas	$831,256,115	$800,446,729	($30,809,386)	158	1,193	$24,399,291	114	462	$7,775,893
Lubbock	$289,731,567	$267,607,361	($22,124,206)	48	117	$9,723,814	13	16	$668,784
Lufkin	$244,086,895	$234,324,495	($9,762,400)	87	191	$3,018,212	29	36	$378,919
Odessa	$477,464,970	$431,816,928	($45,648,042)	63	152	$48,449,795	20	29	$1,358,515
Paris	$298,527,028	$298,292,187	($234,841)	63	181	-$8,852,574	27	47	$1,379,032
Pharr	$150,038,006	$142,737,005	($7,301,001)	31	95	$1,981,838	17	36	$820,911
San Antonio	$613,290,780	$520,972,361	($92,318,419)	114	680	$28,680,709	52	158	$7,652,856
Waco	$382,912,006	$370,378,229	($12,533,777)	110	419	$8,470,257	64	129	$3,582,833
Grand Total	**$3,287,307,367**	**$3,066,575,295**	**($220,732,072)**	**674**	**3,028**	**$115,871,342**	**336**	**913**	**$23,617,743**

Plan Review and Bid Estimation Effectiveness TxDOT Internal Audit Division – Limited Scope

Addenda

A review of 80 completed construction projects from the eight districts selected was performed to determine if addenda were developed to address PS&E errors or omission and could be opportunity for improvement.

- 32 of 80 (40%) projects had addenda developed to address PS&E errors or omission identified after the final plan review process and prior to letting.

Projects Delayed Due to Rejected Bids

For all 25 districts, a total of 56 construction projects had rejected bids from the lettings held between January 1, 2016 and August 31, 2020. Further review of 18 projects selected with rejected bids from six of the eight sampled districts (two had no rejected bids) was performed to determine the root cause for the bid rejection and the potential delay impact.

- Six of 18 (33%) projects with rejected bids in four districts required plan redesign to address errors not identified during the plan review process.
  - The timeline to address the PS&E errors and re-let the projects ranged from 87 to 240 days.

Management Action Plan (MAP):

MAP Owner: Max Proctor, PS&E Processing Section Director, Design Division

MAP 1.1: The Design Division will establish and communicate a metric or metrics that will be used to evaluate plans, specifications, and estimate (PS&E) quality, which is a result of an effective review process.

Completion Date: December 15, 2021

MAP 1.2: The Construction Division and Design Division will create a Design Evaluation Form to facilitate discussions and communicate lessons learned between construction and design personnel within the districts. The form will be approved by TxDOT Administration by July 15, 2022.

Implementation of the Design Evaluation Form by the districts would be required for all projects closing out construction beginning in November 2022.

Completion Date: November 15, 2022

Finding No. 2: Variability of PS&E Interim and Final Review

Condition
Construction project documentation to support districts methodology for review of plans and estimates varied across and within the districts evaluated, as well as, was not retained to support evaluation of the accuracy and completeness of the project plans, specifications, and estimate (PS&E) package. A 2014 Plan Review Process audit also identified variability of statewide project development documentation to support review of plans and final PS&E package.

Effect/Potential Impact
Variability in the plan review process can result in insufficient documentation retained to support the accuracy and completeness of project plans and assumptions used as a basis for the project cost estimates.

PS&E errors or omissions not identified prior to letting can result in change orders which could increase the cost and time to complete the project. Of the 80 projects reviewed:

- 56 had change orders executed due to identified PS&E error and omission.
  - Twenty-eight (50%) projects did not have evidence to support all required levels of review per the district's process.

Criteria
The Project Development Process Manual requires the following:

- Chapter 2, Section 4: estimates are to be periodically updated by the districts.
- Chapter 5, Section 10: an in-house district review of the PS&E package by a multi-disciplinary team as a quality control measure to reduce inconsistencies is required.

The PS&E Preparation Manual, Chapter 5, Section 5, notes the process by which plans and specifications are developed and reviewed varies from district to district. It also states clarity and accuracy in the plans will help achieve timely completion of construction with a reduced probability of having change orders or claims for additional compensation by the contractor.

Cause
A statewide framework to include minimum plan review requirements based on project classification and letting type, checklist/tools to be used in the review and bid estimation process, documentation to be retained to support review, and retention location has not been established. District plan review staff learn their district specific plan review process through on-the-job training utilizing existing staff's experience.

Evidence
Eighty completed construction projects were selected from eight judgmentally sampled districts (between January 1, 2016 and August 31, 2020) to evaluate and understand PS&E review methodology used and retention of supporting documentation.

PS&E Review Methodology

As illustrated in Table 1, the plan review and bid estimation methodology varied across the eight sampled districts (i.e., number and type of milestone review performed, and tools used in

the bid estimation for the PS&E). There was also variance in tools used to perform the plan review including district developed checklists and standard operating procedures.

Table 1

District	Plan Review Intervals (% Complete Milestone)					Type of Review Performed of District	Tools Used by District for Plan Review	Communication of Lessons Learned
	30	60	90	95	100			
Dallas	No	Yes	No	Yes	Yes	Subject matter expert (SME) Team	District standard operating procedure (SOP), review comment log	Comment log and lessons learned meetings
Lubbock	Yes	Yes	Yes	No	Yes	SME Team	30/60/90 & 100% District checklist	General notes, project error log
Lufkin	Yes	Yes	No	Yes	Yes	SME Team	Design Division (DES) SOP, DES submittal checklists	Spreadsheet of project issues
Odessa	Yes	Yes	Yes	No	Yes	Two plan reviewers and SMEs	30/60/90 District checklist	None
Paris	Yes	Yes	Yes	Yes	No	SME Team	DES submittal checklists	Semi-annual meeting
Pharr	No	No	No	Yes	No	Individual and SMEs	95% District checklist	Checklists, review comment forms
San Antonio	Yes	Yes	Yes	No	Yes	SME Team	District pre-letting checklist	Team review meetings
Waco	Yes	Yes	Yes	No	Yes	SME Team	District SOP, checklists (by project type), and comment matrix	Transportation Engineer communicates

Retention of PS&E Supporting Documentation

For the eight sampled districts, a review for retention of documentation was performed during the completion of the 30/60/90% plan review (based on the methodology outlined in Table 1), the engineer's estimate, and the district and DES final review of the PS&E package.

30/60/90% Plan Review

- 35 of 60 (58%) projects had no evidence to support a 30% review was performed.
- 23 of 40 (58%) projects had no evidence to support a 90% review was performed.
- 33 of 70 (47%) projects had no evidence to support a 60% review was performed.

Engineer's Estimate

- 54 of 80 (68%) projects from had no evidence to support review of the pricing in the engineer's estimate.
- 25 of 80 (31%) projects from had no evidence to support review of the quantities in the engineer's estimate.

Final PS&E Review

- 9 of 80 (11%) projects had no evidence to support district final review of the PS&E package.
- 8 of 80 (10%) completed construction projects had no documentation of DES review of the final PS&E package.

Management Action Plan (MAP):

MAP Owner: Max Proctor, PS&E Processing Section Director, Design Division

MAP 2.1: The Design Division (DES) will work with appropriate divisions/districts to revise the 2014 cost estimating guidance, and present the revised guidance statewide as part of MAP 2.2.

Completion Date: December 15, 2021

MAP 2.2: The Design Division (DES) will develop a standard operating procedure (SOP) and PS&E review checklist that will provide minimum review and retention requirements using best practices from districts and DES reviewers. The SOP and PS&E review checklist, and Design Evaluation Form (noted in MAP 1.2) will be posted to the DES website for district reference and use.

DES will host statewide WebEx meetings with the districts to communicate the SOP, PS&E review checklist, updated cost estimating guidance (noted in MAP 2.1), and expected implementation dates by the districts. The WebEx meetings will be recorded and posted to the DES website for districts reference and use in training employees.

Completion Date: April 15, 2022

Finding No. 3: Bid Variance Analysis Documentation

Condition
Documentation to support the district's recommendation for the award or rejection of a construction project exceeding the established letting overrun/underrun threshold (i.e., justification form) did not consistently include the cause for bid variance. Districts' practices for retaining justification forms have not improved in comparison to a 2014 Bid Estimation audit which also identified retention practices needing improvement.

Effect/Potential Impact
With limited or missing documentation of the cause for letting overrun/underrun variances, districts may be unable to justify rationale used in their award/rejection recommendation provided to CST for Texas Transportation Commission approval.

Criteria
CST letting overrun/underrun justification memorandum guidance sent to districts monthly with the letting results states projects require justification by the District Engineer under either of the following circumstances:

- There was only one bidder, and the low bid deviated +/-10% or more from TxDOT's engineer's estimate.
- There were multiple bidders, and the low bid deviated +/-20% or more from TxDOT's engineer's estimate.

CST outlines a two-day time frame for districts to provide the memorandum, and includes the district justifications in the monthly Recommendations Memo for Administration's review/approval. The information is also submitted for Texas Transportation Commission award or rejection of the projects.

Cause
District staff interviewed stated that the two-day time allowance to complete the justification form, obtain district approval, and submit the form to CST did not allow for a complete analysis of why the variance occurred. CST guidance during the testing period (January 1, 2016 to August 31, 2020), recommended districts be more focused on identifying specific bid items that created the major variances rather than explaining why the variance occurred.

Record retention procedures for the justification form have not been established within policy.

Evidence
From the 80 completed construction projects let between January 1, 2016 and August 31, 2020, 52 projects required a justification form from the selected districts to determine the cause of the variance.

Justification Form Analysis

- 20 of 52 (38%) projects had justification forms that included the project bid items that varied (i.e., what varied); however, detail for the cause of the variance (i.e., why varied) was not documented for the $75M in projects.

Retention of Justification Forms

- 15 of 52 (29%) projects in four districts did not have the justification form retained by the district.
  - All 15 justification forms were obtained by CST for review.

Management Action Plan (MAP):

MAP Owner: Duane Milligan, P.E., Director, Construction Division

MAP 3.1: The Construction Division (CST) updated the letting justification guidance document in September 2020 to request that the districts include the cause for the variance in addition to the major bid items that varied.

CST further amended the letting justification guidance document in April 2021 and justification form in May 2021 to include a specific section requiring documentation for the cause of the variance (i.e., why varied) separate from the list of major bid items that varied.

Completion Date: Action Completed

MAP 3.2: Beginning with the June 2021 letting, the Construction Division (CST) will review the justification forms to ensure that all required information to include variance cause is submitted by the districts.

CST will update internal procedures to specify that CST is the record holder for completed justification forms and is responsible for retention in accordance with the Records Retention Schedule. CST will also update the justification guidance document to communicate this with the districts.

Completion Date: September 15, 2021

Finding No. 4: Accuracy of Estimated Construction Project Cost Data

Condition
Engineer's estimate totals and low bid amounts used for the determination and award/rejection recommendations differed between the construction letting data maintained within legacy systems by the Construction Division (CST) and data contained within TxDOTConnect.

Effect/Potential Impact
As the legacy systems currently used by CST are planned to be replaced by TxDOTConnect the data used for construction project contract award/rejection recommendations and approval after system implementation could be incorrect.

Criteria
The TxDOTConnect help guide defines the Engineer's Estimate and Low Bid fields as:

- Engineer's estimate – Most recent estimated cost of construction on the project.
- Low Bid – Total low-bid amount (federal and/or state) for the project including other participation which is local contributions and local matching funds.

TxDOT Security Controls CM-03(02) Testing, Validation, and Documentation of Changes, includes the control requirement to test, validate, and document changes to the system before finalizing the implementation of the changes. The security control defines changes to system to include modifications to the hardware, software, or firmware components and configuration settings.

Cause
TxDOTConnect has multiple fields for letting estimate data to include a specific field titled "Sealed Engineer's Estimate"; however, each field has a different total based on various assumptions including force accounts which would not be included in the engineer's estimate total used to compare against the low bid amount by CST.

Variances between CST letting data and TxDOTConnect data were identified to be caused by:

- Joint bid utility projects let prior to October 2019 were not migrated from the legacy system to TxDOTConnect.
- Non-let change order amounts added to the low bid total in TxDOTConnect.
- Interface at the Control Section Job (CSJ) level with the mainframe resulting in balances not matching when rolled up to the Controlling CSJ (CCSJ) level.
- One project was inadvertently deleted during testing of TxDOTConnect and is being rebuilt in the system.

Evidence
Testing of 842 completed construction projects from the eight judgmentally selected districts was performed to verify the engineer's estimate and low bid amounts matched between TxDOTConnect and data used by CST (i.e., legacy systems) to support decisions on the award or rejection of construction contracts.

- 342 of 842 (41%) projects had absolute differences of $609M noted between the engineer's estimate totals in the CST letting data and TxDOTConnect.

- 86 of 842 (10%) projects had absolute differences of $15M noted between the low bid amounts in the CST letting data and TxDOTConnect.

Management Action Plan (MAP):

MAP Owners: Erika Kemp, MPPM Director, Transportation Programs Division (TPD)
Benjamin McCulloch, Reporting Lead, TPD

MAP 4.1: The Transportation Programs Division (TPD) will complete the following TxDOTConnect data quality initiatives:

- Migrate from DCIS the outstanding joint bid utilities project information, and the missing project information for engineer's estimate, low bid, and historical bid items.
- Interface the actual low bid value at the CCSJ level from the mainframe, instead of the CSJ level with roll-up to the CCSJ level.
- Recalculate low bid values in TxDOTConnect to match historical bid item values from mainframe and no longer recalculate when a non-let change order project is associated post-letting.
- Confirm the Letting Estimate on the Sealed Engineer's Estimate summary table matches the Construction Division Engineer's Estimate used for the bidding variance.
- Confirm Letting Estimate calculations are correct and updated as needed for all historical projects migrated to TxDOTConnect.

Completion Date: November 15, 2021

Observation and Recommendation

Audit Observation (a): Classification of Project Design Source

The ability to track and report on the project design source (i.e., in-house or third-party consultant) is limited to a single field in TxDOTConnect. From the sample of 80 completed construction projects let between January 1, 2016 and August 31, 2020, five (6%) projects had an incorrect designation for the project design source field in TxDOTConnect. In addition, although TxDOTConnect includes a field to select when a project is designed by TxDOT or a third-party consultant, it does not have an option to capture specific details when the project development is shared by TxDOT and the third-party consultant.

Effect/Potential Impact

Without complete and accurate project design source information in TxDOTConnect, reporting and trending of TxDOT versus third-party consultant designed project data is limited.

Audit Recommendation

The Transportation Programs Division – Transportation Programs Operations & Reporting Section should work with the Design Division to determine the best option within TxDOTConnect to identify the source(s) of project design. Once determined, TxDOTConnect guidance should be updated to provide instructions on how to code projects with both a TxDOT designed and consultant design component.

Summary Results Based on Enterprise Risk Management Framework

Audit Results Dashboard Plan Reivew and Bid Estimation Effectiveness			
		Scope Areas Evaluated	
Business Objectives (Reporting, Operational, Compliance)		O, C	R, O, C
ERM Component	Control Activities	PS&E Quality Control	Engineer's Estimate Variance Analysis
Control Environment	Organizational Tone	1, 2	1, 3, 4
	Business Objective/Goal-Setting		
	Resource Capacity		
	Forecasting/Budget		
	Training and Development		
Risk Assessment	Risk Identification/Planning		
	Risk Assessment/Impact Analysis		
	Risk Response/Cost-Benefit Analysis		
	Business Continuity		
Control Activities	Policies/Procedure Development & Maintenance	1, 2	3, 4
	Approvals/Authorizations		
	Supporting Evidence/Records Retention	2	
	Segregation of Duties/System Access		
	Safeguarding Assets/Security		
Information & Communication	Information Classification		
	Information Input		
	Information Processing		
	Information Output		
	Internal and External Reporting		4, (a)
Monitoring	Exception Reporting Review		
	Reconciliations		
	Root-Cause Analysis		1, 3
	Evaluations/Inspections	1, 2	
	Management Action Plans		
Scope Area Assessment			

Rating Assessment Grid	Exemplary	Satisfactory	Needs Improvement	Unsatisfactory

Closing Comments

The results of this audit were discussed with the Director of District Operations, Design Division Director, Construction Division Director, and District Engineers on June 24, 2021. The Internal Audit Division appreciates the cooperation and assistance received from the Design and Construction Divisions, as well as, districts contacted during this audit.